

**IN THE SPECIFICATION**

**Please amend the paragraph on page 2, lines 7-27 as follows:**

In orthogonal frequency division multiplexing, frequency spacing is arranged so as to null the correlation between a modulation band signal transmitted by an nth subcarrier of a multicarrier transmission and a modulation band signal transmitted by an (n+1)th subcarrier. If we assume that a symbol (a complex baseband signal) transmitted by the nth subcarrier (center frequency:  $f_{nf_n}$ ) is represented by  $z_n (= a_n + j b_n) z_n (= a_n + j b_n)$ , then we may write modulation band signal  $s_n(t) = \text{Re}[z_n \exp(j2\pi f_{nf_n} t)] s_n(t) = \text{Re}[z_n \exp(j2\pi f_{nf_n} t)]$  (where Re represents the real part of the complex number). The requirement for the (n+1)th subcarrier to be orthogonal to the nth subcarrier is that the cross correlation between  $s_n(t)$  and  $s_{n+1}(t)$  be 0. If the frequency spacing between neighboring subcarriers is  $f_{df_d}$  and the period of the symbol  $z_n z_n$  is T, then, in order for the cross correlation to become 0, it will suffice for  $f_{df_d} = k/T$  ( $k = 1, 2, \dots$ ) to hold and the minimum spacing will be  $f_{df_d} = 1/T$ . A multicarrier multiplexing scheme having frequency spacing is an orthogonal frequency division multiplexing scheme.

**Please amend the paragraph on page 4, lines 8-27 as follows:**

According to the principles of multicarrier CDMA, N-number of items of copy data are created from a single item of transmit data D, as shown in Fig. 14, the items of copy data are multiplied individually by respective ones of codes  $C_1$  to  $C_N$ , which are spreading codes (orthogonal codes), using multipliers  $9_1$  to  $9_N$ , respectively, and products  $DC_1$  to  $DC_N$  undergo multicarrier transmission by N-number of subcarriers of frequencies  $f_1$  to  $f_N$  illustrated in (a) of Fig. 15. The foregoing relates to a case where a single item of symbol data undergoes multicarrier transmission. In actuality, however, as will be described later, transmit data is

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converted to parallel data of  $M$  symbols, the  $M$ -number of symbols are subjected to the processing shown in Fig. 14, and all results of  $M \times N$  multiplications undergo multicarrier transmission using  $M \times N$  subcarriers of frequencies  $f_1$  to  $f_{N_M f_{N_M}}$ . Further, orthogonal frequency/code division multiple access can be achieved by using subcarriers having the frequency placement shown in (b) of Fig. 15.

Please amend the paragraph on page 5, lines 12-34 as follows:

In the case of a downlink (transmission by a base station), a code multiplexer 15 code-multiplexes the subcarrier signals generated as set forth above and the subcarriers of other users generated through a similar method. That is, for every subcarrier, the code multiplexer 15 combines the subcarrier signals of a plurality of users conforming to the subcarriers and outputs the result. A frequency interleaver 16 rearranges the code-multiplexed subcarriers by frequency interleaving, thereby distributing the subcarrier signals along the frequency axis, in order to obtain frequency-diversity gain. An IFFT (Inverse Fast Fourier Transform) unit 17 applies an IFFT to the subcarrier signals that enter in parallel, thereby effecting a conversion to an OFDM signal (a real-part signal and an imaginary-part signal) on the time axis. A guard-interval insertion unit 18 inserts a guard interval into the OFDM signal, an orthogonal modulator 19 applies orthogonal modulation to the OFDM signal into which the guard interval has been inserted, and a radio transmitter 20 up-converts the signal to a radio frequency, applies high-frequency amplification and transmits the resulting signal from an antenna.

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**Please amend the paragraph on page 6, line 30 to page 7, line 7 as follows:**

Fig. 19 is a diagram showing structure on the receiving side of MC-CDMA. A radio receiver 21 subjects a received multicarrier signal to frequency conversion processing, and an orthogonal demodulator 22 subjects the receive signal to orthogonal demodulation processing. A timing-synchronization / guard-interval removal unit 23 establishes receive-signal timing synchronization, removes the guard interval GI from the receive signal and inputs the result to an FFT (Fast Fourier Transform) unit 24. The FFT unit 24 converts a signal in the time domain to  $N \times M$ -number of subcarrier signals. A frequency deinterleaver 25 rearranges the subcarrier signals in an order opposite that on the transmitting side and outputs the signals in the order of the subcarrier frequencies.

**Please amend the paragraph on page 20, lines 8-19 as follows:**

After deinterleaving is carried out, a fading compensator 65 performs channel estimation on a per-subcarrier basis using the pilot time-multiplexed on the transmitting side and applies fading compensation. In the Figure, a channel estimation unit  $65a_1$  is illustrated only in regard to one subcarrier. However, such a channel estimation unit is provided for every subcarrier. The channel estimation unit  $65a_1$  estimates the influence  $\exp(j\Phi)$  of fading on phase using the pilot signal, and a multiplier  $65b_1$  multiplies the subcarrier signal of the transmit symbol by  $\exp(-j\Phi)$  to compensate for fading. Like the multiplier  $65b_1$ , multipliers  $65b_2 - 65b_N$  compensate for fading.

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**Please amend the paragraph on page 24, lines 19-30 as follows:**

After deinterleaving is carried out, the fading compensator 174 performs channel estimation on a per-subcarrier basis using the pilot time-multiplexed on the transmitting side and applies fading compensation. In the Figure, a channel estimation unit 174a<sub>1</sub> is illustrated only in regard to one subcarrier. However, such a channel estimation unit is provided for every subcarrier. The channel estimation unit 174a<sub>1</sub> estimates the influence  $\exp(j\Phi)$  of fading on phase using the pilot signal, and a multiplier 174b<sub>1</sub> multiplies the subcarrier signal of the transmit symbol by  $\exp(-j\Phi)$  to compensate for fading. Like the multiplier 174b<sub>1</sub>, multipliers 174b<sub>2</sub> – 174b<sub>N</sub> compensate for fading.

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